A Collaborative Multidisciplinary and Without-Walls Research Curriculum in Global Health

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Abstract. Longitudinal and collaborative global health research curricula to train a well-versed global health corps through skills building in assessment and evaluation are lacking. A without-walls research curriculum was offered to medical and public health students between 2007 and 2015. Mentored cross-disciplinary research projects were developed and implemented in partnership with communities. A multilevel mixed methods design, including semi-structured interviews, post-curriculum surveys, presentations, publications, postgraduation metrics, and feedback from project sites, evaluated educational outcomes. Students ($N = 25$; aged 27 ± 1.9 years; 90.5% female) participated in the studies in 12 countries, resulting in 26 national-level presentations and 24 peer-reviewed publications, including per student average and range of Institutional Review Board submission (0.95; 0–3), poster presentation (0.85; 0–3), oral presentation (0.65; 0–2), and peer-reviewed submission (1.05; 0–4). On average, the studies (40% mixed methods) lasted 2 years. Analyses and manuscript writing were the most challenging; data collection and presentations were the most rewarding. Majority of the participants strongly agreed with achieving skills in community engagement, interviewing techniques, research design and implementation, research dissemination, and career development. Interview themes included expectations and learning goals, effective mentorship, impact on career goals, and ethical learning. Mentorship qualities were accessibility, real-time problem solving, research expertise, advocate, and balancing guidance with independence. Project sites' feedback was overwhelmingly positive regarding the projects' impact. Postgraduation participants hold positions in humanitarian organizations, research programs serving the underserved, and primary care residencies, fellowships, and faculty. This experience illustrates the feasibility and effectiveness of mentored global health research and underlines the crucial link between community collaboration and scholarship for effective global health practice.

INTRODUCTION

There has been a growing interest in global health experiences among public health and medical students,^{1–8} which could be attributable to improved views toward social responsibilities and rights to health,^{9–12} and an increasing coverage of humanitarian and international health crises in the last decades.^{13,14} Health science professionals have been increasingly engaged in global health projects, including clinical or public health services, social services, and capacity building for local disadvantaged communities, and advocacy.^{2–4,10,15,16}

In the context of education, global health is defined as “an area for study, research, and practice that places a priority on improving health and achieving equity in health for all people worldwide. Global health emphasizes transnational health issues, determinants, and solutions; involves many disciplines within and beyond the health sciences and promotes interdisciplinary collaboration; and is a synthesis of population-based prevention with individual-level clinical care.”¹⁷ There are an abundance of didactic sessions, sporadic exposure via talks or conferences, and short-term service-oriented missions with a theoretical approach with mostly international focus.^{2,4,6,18–20} Accordingly, engagement in collaborative research activities or scholarly work is less prevalent, which might be largely due to the lack of organized support from schools or on the ground international organizations or communities, challenges in the health or social systems within host countries, or limited funding opportunities.^{4–6,10,19,21,22}

There is a lack of formative global health and health disparities research experiences for undergraduate and graduate-level trainees, which could help build a more effective global

health workforce from early global health exposure.^{2,3,6,7,11} This may indicate a need for multidisciplinary longitudinal curricula, focusing on mentored and collaborative global health research, which could not only provide meaningful data for local communities but also skills in assessment and critical evaluation for context-based solutions. This article describes the development, implementation, and evaluation of an open-access, without-walls longitudinal, and collaborative research-focused global health curriculum to train well-versed global health corps.

MATERIALS AND METHODS

Curriculum overview. The curriculum constituted of mentored collaborative research projects in partnership with nongovernmental organizations. It included predeparture, data collection, data analysis, post-field experience, and data dissemination components. Beginning in 2007, the core faculty, in partnership with participating organizations, offered the curriculum using an open-access multi- and cross-institutional and interorganizational structure and approach. This curriculum was intentionally designed as a “without-walls curriculum,” meaning that it was hosted in no specific institution but attached to the faculty mentor because of the multi- and cross-disciplinary nature of the work, diverse background and needs of the participants, a wide range of the context and background work of participating organizations, and temporal needs of the communities. Students were informed about the curriculum through multiple sources; information available at their respective medical schools, direct contact with the core faculty or at the relevant professional association meetings, or referrals from the faculty in their schools. Students ($N = 25$) were from a range of medical and public health schools (two in premedical programs). Medical or public health students took the curriculum either as a

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required component of their global health concentration, capstone or thesis requirement or practicum, or as an elective. All projects were developed collaboratively with international nongovernmental organizations (INGOs) and local communities, based on the communities' priorities and needs as assessed by organizations working in the respective communities (see Supplemental Information 1). Project topics included infectious diseases, including malaria and HIV/sexually transmitted infections (STIs) women's health, and family planning issues, chronic disease management, malnutrition, refugee health, and health-care access issues among the underserved in the United States, including immigrants, homeless, and asylum seekers/torture survivors. Most of the students had minimal (up to weeks volunteering) or no prior global health experience. On average, the research studies lasted 2 years (range: 6 months–3 years). Most of the students continued to participate in the continuing phases of the projects beyond their academic requirements. Studies were mostly mixed methods or qualitative (86%), educational interventions for the local population and program evaluations for INGOs, and in public health or population-based medicine (85.7%). Sociodemographics, baseline characteristics, and project-related characteristics are presented in Table 1.

Curriculum development. *Learning objectives and program requirements.* Broad categories of global health practice and research, sociocultural and advocacy work, and career development competencies were informed by experiences from global, local, and domestic projects in the underserved communities, including the use of limited resources and the collaborative work with local communities.^{6,7,11,23} Competencies were exercised throughout the overall curriculum span, from the inception to the dissemination of research findings. Because of the varied settings of the research projects, and differences in their design and evaluation methods, certain categories of competencies may have been more emphasized and achieved by different students (see Table 2).^{6,7,18–20,23–28}

Curriculum structure. The curriculum director, the research mentor for all students' research projects, had training in medicine, public health, tropical medicine, and research with more than two decades of experience with INGOs in global health. The curriculum structure was designed and implemented with flexibility and customized to the specific needs of the stakeholders and students' educational and training level. All training and mentorship were individually oriented. Didactic training was tailored to the specific research topic and context, the locality and INGOs' area of work and expertise, and the specific background of students. The curriculum director provided individual predeparture preparation for all students using a consistent approach with generic and specific components (related to the context, research topic, and local and international resources), face-to-face briefing, supplemental readings, and role playing or scenarios and recapping. Additional supports to implement projects were provided by INGO's staff and communities depending on the projects' nature, logistical challenges, and custom and cultural issues, which also fulfilled some of the competencies. The faculty mentor had a previous working relationship with all the INGOs, served as their technical or research advisor, and personally met the INGO staff and leaders to review programs and discuss the needs before any research relationship was forged to host students.

TABLE 1

Demographics and characteristics of students participating in global health research curriculum and projects, 2007–2015

Indicator	N (%)
Age (mean, SD) years	27.05 (1.99)
Gender (female)	90.5%
Students	
MD students	18/25
MD/MPH	4/25
Pre-Med	2/25
MPH	5/25
Prior GH experience (N = 21)	
Extensive (years)	2
Average (months)	4
Minimal (up to weeks)	11
None	4
Average time with advisor/mentor for GH project (N = 21)	
Three years	1
Up to 3 years	4
Up to 2 years	6
Up to 1 year	8
Up to 6 month	2
Type of research design (N = 21)	
Qualitative	10 (48%)
Quantitative	3 (14)
Mixed methods	8 (38)
Type of research (N = 21) (categories are not exclusive)	
Public health or population-based medicine	18 (85.7%)
Clinical	5 (23.8)
Social science	4 (19)
Advocacy	9 (42.9)
If you had participated in other prior research project? (N = 21)	14
Less involved in prior research project?	8
About the same level of involvement in both?	4
More involved in prior research project?	2
If you participated in projects after your GH experience (N = 21)	13
Your GH experience was useful for your project	11
Was not useful	1
No response	1

The safety and security of the sites was assessed by the respective INGOs. The faculty mentor conducted further assessment when necessary (through other INGOs or geopolitical information). An INGO staff was always present when students were on the international site. The faculty mentor accompanied and introduced students to the sites and discussed security and safety trainings and implementation strategies in a practical and detailed manner.

Curriculum components and process. Predeparture. Planning included the following:

1. *Community and INGO input and application process:* First, a list of potential projects and their goals were generated based on the input from communities and INGOs. For most students included information about potential sites, potential or ongoing projects, and collaborating organizations. Students were able to match their interests to the specific topics or projects. Students were connected via Skype or phones and shared their Curriculum Vita with the INGO staff and community leaders and were individually interviewed by the faculty mentor with continuing discussion over e-mails or meetings to solidify commitments, personal objectives, and potential opportunities that fit stakeholders' needs.
2. *Mentorship:* It started on Day 1 with setting expectations, requirements, and codes of conduct that were agreed

TABLE 2

Broad range of competencies and skill sets for medical and public health students in global health research, 2007–2015^{6,7,18–20,23–28}

Competencies	Outcomes/skill sets
Core public health science	Identifying, understanding, and addressing major global public health issues
Assessment and analysis	Interviewing participants and applying qualitative and quantitative surveys
Policy and planning	Measuring simple health indicators and outcomes
Implementation and evaluation	Cultural sensitivity and competencies working with the people from different culture/customs
Partnership, collaboration, and advocacy	Participatory research with local and international organizations and communities
Diversity	Research-based advocacy (using systematic data to make policy change)
Leadership	Collaborative health work with communities/working with and for the community and sustainability
Core medical science	Skills in research design and implementation
Patient care and medical knowledge	Understanding basic research flaws and biases
Clinical epidemiology and evidence-based practice and guidelines	Presentation, dissemination, and publication of scientific findings
Communication, interpersonal, and working with communities	Understanding of critical components of a scientific article and critical appraisal of scientific articles
Cultural competencies	Application of basic epidemiology
Effective communication with patients and communities	Career development in global health
Practice-based learning and improvement	Improving or gaining core global health and humanitarian values
Collaborative learning and team work	Personal growth
Institutional learning	Population-based medicine and public health practice
Practice guidelines in resource-poor settings	Clinical competencies at the level of the project and student career stage
Teaching/educating individuals and communities	Evidence-based practice and research
Professionalism and ethics	Understanding health and human rights and social justice issues
Code of conduct	
Professional behavior and cultural differences	
Understanding personal biases	
System-based practice	
Major INGOs, international agencies, and government sector	
Health-care workforce and the cost	
Advocacy for patients and policy change	
Health-care system and delivery in developing world	
Managing limited resources (international or domestic resource-poor settings)	
Global public health priorities/issues	
Current and emerging global public health priorities for specific regions	
Special population/the underserved	
Noncommunicable and communicable diseases	
Humanitarian emergencies	
Health and human rights	
Global health ethics and dilemmas	

INGOs = international nongovernmental organizations.

upon for positive working relationship between the faculty–student pair and all parties. In line with community priorities, specific research questions were developed and agreed upon during meetings and discussion sessions among all stakeholders.

3. *Study design and Institutional Review Board (IRB)*: After further communication and work to finalize the details of projects and study design, the faculty–student pair completed and submitted the IRB applications for entities in both the United States and international sites for approval.
4. *Logistics of travel and data collection*: All logistical issues were discussed and addressed months before departure (funding, travel health and insurance, flights, accommodation, research expenses and human resources, site supervision, and community introduction). Other issues discussed prior and during data collection phase included collaboration with partners and communities, cultural issues, potential ethical challenges, managing limited resources, roles and responsibilities, data collection

challenges, and analysis process. In addition, data presentation, manuscript writing, and authorship requirements were discussed and agreed upon.

Data collection phase. The faculty mentor stayed with students in international sites (1–4 weeks) to reinforce working in team, troubleshooting, and efficiency learning. The mentor and local staff helped address physical and psychological challenges of living alone in locations without immediate communication access, and feelings of frustration when encountering extreme medical needs in communities that were outside the projects' scope. Students provided weekly bullet point updates including 1) activities in the preceding week, challenges, and strategies used to address them and 2) specific plans for the coming week and needed resources. Students had 24/7 access to their mentor and local preceptors' cell phones for urgent support and Skyped or spoke with their mentor biweekly. The faculty mentor regularly communicated with local staff to ensure further support, provided sample

articles and analysis templates, and regularly supported students in interim data analysis, monitoring outlying data, addressing setbacks, and refining data collection processes.

Data analysis, post-field experience, and data dissemination plan. All students were debriefed immediately upon return and psychosocial support was provided when needed for emotional exhaustion, overworking, or overextending oneself responding to community needs, and to encourage well-being through a constructive reaction. A task list was often created to structure analyzing data and preparing reports for the community or INGOs. Interests, commitments, timetables and tasks, and authorship criteria were agreed upon between all stakeholders. Samples and templates were provided for writing INGO or local community reports and preparing PowerPoint presentations, posters, and oral presentations (specific to the study design or research topic when possible). Through continuous weekly meetings or communication, the faculty mentor was closely involved in supporting data analysis, finalizing INGO or community reports, conference selection, manuscript writing and selection of relevant journals, manuscripts' submission, revisions, and finalizing publications considering study merit and trajectory of the student's career path.

Collaboration, site logistics, and funding. A diverse group of INGOs offering social health, public health, or medical services collaborated and were main stakeholders and partners in the process of developing research questions, the selection and course of data collection, different research settings and content, and the analysis and presentations, which helped provide opportunities for inter- and cross-disciplinary work. Individual or paired students either personally completed or handed over their research project to another student. All students on the same long-term project, going to the same country, or working with the same INGO were connected to each other over time to share their experience. This process helped students interact with each other and better understand challenges and opportunities. Most students on international sites received stipends, flight, and accommodation secured through small grants and by the faculty mentor (on average \$2,000–\$2,500 for 8 weeks). Others raised money from family and friends. Funding to support actual research expenses was largely minimal and from the INGOs or pure volunteerism. The faculty mentor spent 150–200 hours to support each student project. Travel expenses or direct support for faculty mentor was minimal (10% salary) and often included personal contributions, small fundraising, and non-compensated works over evenings and weekends. The faculty mentor managed field visits during summer and mid-winter because of breaks in graduate-level teaching, some modest departmental research grants for other projects that provided some flexibility in time and travel, and by shuffling clinical schedules.

Curriculum assessment. A multilevel assessment and mixed methods design with four components was applied that comprised attitude, self-efficacy, and satisfaction surveys; semi-structured interviews to assess students' experiences and perceptions; objective assessment of educational outcomes, including research presentation, reports and publications, and postgraduation metrics; and process outcomes and feedback from the project sites.

Data collection and assessment. The anonymous online quantitative survey included a consistent questionnaire with

10 main questions, five of which had between six and 20 subcategories that used both dichotomous and Likert scale questions (see Supplemental Information 2). Semi-structured audio-recorded interviews were conducted by an independent trained research assistant over the phone, Skype, or face-to-face ranging between 6 months and 3 years post-curriculum depending on the projects' duration. A 14-item open-ended question tool with directing probes was used to elicit data (see Supplemental Information 2). Through a qualitative descriptive approach, two independent research assistants used content analysis to identify core perceptions, experience, and attitude regarding curriculum components. A preliminary coding scheme was developed with critical deliberation about initial coding until a high level of agreement was achieved.^{29–31} Reviewers independently coded all transcripts, then discussed and identified conceptual categories, and agreed upon major emergent themes. To objectively assess students' educational outcomes, metrics such as presentations and publications were included. Formal and informal feedback sessions were conducted with collaborating INGO counterparts during and after the students' return and by concluding the projects. Informed consent was obtained from all participants. The study was approved by the Mount Sinai School of Medicine and NYU Lutheran IRBs.

RESULTS

The results are presented for quantitative survey, semi-structured interviews, educational outcomes and postgraduation metrics, and process outcomes and sites' feedback. Twenty-one students filled out surveys and 19 participated in semi-structured interviews. Not all components of the quantitative and qualitative surveys were applicable to all because different students participated in different phases of the projects.

Findings from surveys. Experience with manuscript writing followed by data analysis and IRB applications (without perceived rewards) were the most challenging. Data collection, then write-up and presentation were the most rewarding. Table 3 presents related self-efficacy and attitudes' data.

Findings from semi-structured interviews. *Motivations and expectations for involvement in global health projects.* Only a small number of participants had prior global health experience. No participants identified research as their sole motivation, yet a majority identified developing research skills as an expectation, and reported improved interest and perspective on global health research after completing the project. *"Initially, my primary interest was in global health. . . Over time-as my research project took shape- I began to see how it could benefit the community we were working in. This made the research aspect more meaningful to me and changed my motivation (P2)."* *"This global health experience exposed me for the first time to qualitative research and focus groups. . . I think it was a challenge not having numbers and data points to analyze. But the utility of focus groups research was clear to me from the moment we started collecting the data, and it was ultimately extremely interesting and rewarding to draw conclusions from the data we collected (P3)."*

Setting and meeting learning goals. Most of the participants appreciated and reported meeting preset goals and learning objectives of research as well as public health, and sociocultural learning. *"My objectives were to learn how to conduct a*

TABLE 3

Attitude, experience and satisfaction, and self-efficacy among medical and public health students after participating in without-walls global health research curriculum, 2007–2015

Indicate your agreement with competencies you gained through participation in your global health research project (N = 21)*	Strongly agree	Neither agree or disagree	Strongly disagree
Advancement of core global health and humanitarian values	13	1	0
Improved understanding and recognizing global public health issues	13	1	0
Improved personal growth	17	0	0
Satisfaction with professional growth achieved	12	0	0
Improved understanding of health and human rights and social justice issues	10	6	0
In interviewing subjects	11	2	2
In participatory research with local NGOs/community	13	4	2
In general research design and implementation	10	1	0
In presentation, dissemination/publication of findings	10	4	0
In critical appraisal of scientific articles	3	8	0
In application of basic epidemiology	2	9	1
In career development in global health	8	5	1
In evidence-based practice	5	13	0
In working with and for the community	12	1	0
In cultural sensitivity and competencies working with people from different culture	15	3	0
In engaging with the community	10	2	0
In evaluating different health perceptions	9	3	0
In considering ethical approaches to global health	8	1	0

NGO = nongovernmental organizations.

* Not everyone was involved in all project's phases or had the same project design; therefore, survey components were not applicable to all.

qualitative project while keeping the community wellness in mind. . . I learned how to take the cultural aspects of people's lives into account when interviewing them and speaking with them (P1). "I expected to learn how to run a research project. . . how to do that and how to work in a country that I was unfamiliar with. My expectations were met very much (P8)."

Ethical learning. Students identified two areas of ethical experience. One involved the extent to which the project was giving back to the community beyond the scope of the project. The other was the inherent features of a local health system and its limitations. *"It was important to remain focused on what the goals of our project was. . . beneficial to the local community. . . It is one thing to "do no harm", but it is a different battle altogether to do something that is helpful and meaningful to the community (P3). "I felt a little bit uncomfortable that we weren't providing [more] service to these kids other than a research service. . . but I do feel like my concerns were responded to, listened to. . . I felt that [NGO] had a really good solution to that or compromise to that (P8)."* *"I observed it – kind of being in the health system there. It was kind of crazy for me to see women having to give cash bribes just to get good care (P11)."* *"I realize a lot more limitations to GH work. I have a better understanding of what a career or projects abroad entail (P11)."* *"IRB protects research subjects very well, not much ethical challenge (P9)."*

Challenges on the international sites. The challenges largely included logistics, time management, and overcoming cultural differences. Strategies to overcome these included planning ahead, clear support from and communication with the faculty mentor, and support from family and friends. *"Logistically, data collection is hard in certain conditions. . . often not high quality but it is still important for ethical/human rights advocacy. Learning to present imperfect data in a meaningful way is an important skill I learned (P6)."* *"I completed my project with another classmate. . . gave me a lot of emotional/personal support (P2)."* *"Going into an unknown community and not only understanding the cultural differences but getting them to trust me enough to share some of their most difficult experiences (P1)."*

Mentorship relationship and qualities. Most participants initiated their relationship with the faculty mentor because they had met the faculty mentor through a graduate course, talk/presentations, or another research setting. Some perceived the mentor as "hands on," whereas others noted they valued the independence/ownership over their project. The mentor's greatest strength was his availability and accessibility. *"The right amount of guidance and independence (P16)."* *"My expectations were met very much. My project working with my mentor was very wonderful because he was both hands on and hands off (P8)."* *"You should be able to have a lot of dialogue back and forth. He was really approachable (P7)."* *"My mentor. . . went above and beyond all my expectations (P19)."*

Impact on career path and career goals. For a majority, their experience helped gain professional growth and shape or confirm career goals, including working with an underserved population, and incorporating global health into their career. *"It deepened my commitment to global health. . . as a part of my career. I learned a lot about how to put a project together from the start and how to interact with NGOs and local people (P4)."* *"I think it gave me that impetus to stay committed despite being in a field in which global health is not a priority (P14)."* *"Because of this I actually ranked my residency programs based on ability to work in a public hospital serving the underserved as well as possible quality of global health experiences (P1)."* *"Strengthened my commitment. . . and gave me a more lucid perspective on the challenges and issues surrounding working with underserved populations (P16)."*

Educational and process outcomes. Students (N = 25; aged 27 ± 1.9; 90.5% female) participated in 27 studies in 12 countries, resulting in 26 national-level presentations and 24 (mean 1.05; R: 0–2) peer-reviewed publications, including per student average and range of IRB submission (0.95; 0–3), poster presentation (0.85; 0–3), oral presentation (0.65; 0–2), peer-reviewed submission (1.05; 0–4), and project reports (0.9; 0–3). Four students graduated with distinction in research. The resultant reports and publications clearly describe

community benefits and impact of specific projects. Two students did not publish and some others published more than one article. After graduation, of a total of 25 trainees, two are currently in medical school, two are working for major U.S.-based humanitarian organizations, one works in a research program serving the underserved, three are doing global health fellowships after residencies, 13 are completing primary care residencies, two are primary care faculty, one is doing primary care fellowship, and one in a specialty residency. Two medical students did not complete the curriculum and evaluation because of personal conflict forcing early departure from international site and personal initiatives outside of the IRB-approved process. Mitigations and debriefing involving the faculty mentor, international site staff, and school officials were performed. Subsequent students completed both projects. Feedback from project sites and INGOs overwhelmingly indicated the usefulness of projects and their incorporation into routine community or INGO work. There were no concerns from local communities except for two female students with minor issues in local culture and customs, which were immediately mitigated by the faculty mentor, INGO director, and school staff.

DISCUSSION

Global health curricula often have a more theoretical and didactic approach, a purely international focus, or they lack rigorous research or longitudinal components.^{2,4,6,15,18-20} This experience presents the feasibility and short-term efficacy of mentored and collaborative global health research training and highlights the crucial educational link between global health, community collaboration, and scholarship at the intersection of the disciplines of medicine, public health, social science, and advocacy where each project covered at least two disciplines. By improving skills in conducting global health research, the curriculum provided an opportunity for research-based advocacy in global health that generally lacks reliable data. The remarkable publications and presentations not only shed light on the situation of the largely neglected populations but also practically provided learning in research-based advocacy to reinforce policy changes.

Much of service- or education-oriented international experience lacks any formalized research component that directly addresses local communities' needs.^{1,4,5,10,18,26} The unique approach of participatory research focus helps highlight the process by which geopolitical, social, and culturally specific determinants of health intersect across local, national, and global public health systems. Along with rigorous research support by the faculty-student pair, the curriculum emphasized the collaboration and community's role in setting priorities built on prior working relationships with INGOs, which in turn improved satisfaction for all stakeholders. Closely mentored community engagement with inputs from all stakeholders in priority settings and developing research question improved cross-cultural experiences, cultural sensitivity, and effective communication across cultural and sociopolitical barriers. Improved skills regarding evaluation and interviewing subjects, collaborative work with local communities and INGOs, and managing limited resources and ethical challenges will likely have positive impacts for future work in global health and for underserved in the United States.^{3,7,8,11,32} By aspiring to build skills consistent with community values, future global health

practitioners can empower the global health system to better mitigate challenges and improve health services.

In spite of significant increase in global health activities in public health and medical schools,^{1-8,33} they often occur overseas and in the developing world.^{1,4} There are, however, domestic opportunities with the immigrant and refugee populations that represents 12% of the U.S. population,³⁴ or with an estimated 3.5 million homeless population.³⁵ This curriculum provided such opportunities for students to further recognize the interplay between systems and individual- or provider-level barriers to health care, and hopefully better address them for other vulnerable populations such as racial or ethnic minorities, individuals of different sexual orientations, and other poor or underserved in the United States. The improved understanding of human rights, social justice, and global public health issues, and the advancement of humanitarian values among participating students could serve as an important factor in pursuing global health careers and human rights work, help build a more effective global health crops,^{2,3,6,7,10,11} and bridge overarching sociopolitical barriers to assure that humanitarian values will translate into effective global health services. Important elements in making this curriculum more valuable, which is evident from and discussed in the resultant peer-reviewed publications and presentations, were the utility of the projects, ownership by the communities, and the incorporation of the findings into ongoing local community or INGO work.

Barriers, challenges, and lessons learned. General challenges included trainees' lack of experience with limited resources; securing local mentorship; ethical challenges at clinical, public health, or organizational levels²¹; focusing on targeted services; and moving beyond awareness raising among trainees and toward skills building. There were logistical challenges with local travel or safety and security at international sites or the underserved and unfamiliar neighborhoods in the United States, which at times required protocol adjustments. Close collaboration before the trip with and direct input from the mentor, community leaders, and INGOs staff helped address challenges and mitigate issues with social system differences and efficacy at the local level. Staying within the limits of one's expertise despite encountering enormous local needs was addressed through frequent debriefing sessions focusing on more tangible and addressable objectives. Nevertheless, most students provided additional social capital by connecting local communities to other potential resources. Other important challenges were cultural preferences that were in sharp contrast with one's own (including views toward rights and women's health issues), and differences in health perception and expectations, which were mitigated through supports from local stakeholders. Continued feedback sessions and constant communication among all involved parties helped with problem solving regarding cultural and system differences. Other challenges included emotional difficulties students could experience in remote areas without their usual social support or communication venues. Students were coached for best personal coping strategies and better integration into their community and, at times, were placed in pairs or linked to other international staff in the locality.

Semi-structured interviews provided a better forum to elicit effective mentorship practices including mentor's accessibility and availability, real-time problem solving, and shared

ownership of the project. Major challenges faced by the faculty mentor were the lack of financial and logistical support and the large amount of personal time needed to help projects move forward. These were largely addressed with setting expectations and commitments in advance and preserving morale and the spirit of volunteerism by investing in the work that directly addressed local community needs.

This study is not without limitations. Self-efficacy evaluations and satisfaction surveys despite being anonymous are prone to social desirability bias. The surveys and semi-structured interviews were performed by an independent assistant and analyzed by two independent reviewers. In addition, not all students were involved in all components of research or had international projects; hence, some questions were not relevant to their experience. The curriculum was primarily designed for attitude and skills building. Measurable outcomes such as presentations and publications were important to objectively assess skill development.

CONCLUSION

This curriculum demonstrates the feasibility of a close mentorship in global health research and underlines the crucial educational link between clinical and population-based medicine, community collaboration, and scholarship that will hopefully lead to more effective global health practices, nationally and internationally. Health professionals will likely be well positioned to support local or international health initiatives if they are equipped with the necessary attitude and skills to eliciting, evaluating, applying, and presenting findings and data appropriately. At the heart of global health interventions and practice is advocacy for policy and political actions through the lens of research, and to address the fundamental conditions affecting the health of populations by applying evidence-based findings.

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